

# GENERAL SPECIFICATIONS

# ULTRASONIC VORTEX FLOWMETER (PPS resin series)



GS-F3040E-04



## Overview

The ultrasonic vortex flowmeter is a flowmeter only for the liquid where the Karman vortex regularly generated in the downstream of the vortex shedding bluff body put in the flow is detected with the ultrasonic sensor of non-contact.

In the PPS resin series, there is neither a seal nor a pocket, except in the piping connection part, because liquid contact parts are molded as one body with a PPS resin. Therefore, the PPS resin series is suitable for the measurements such as chemicals, water and pure water.

## Features

### ●High Accuracy

Because the Karman vortex frequency is detected by ultrasonic, the flow can be measured with a high accuracy by a wide flow range.

### ●Excellent Corrosion-resistant Feature

Because an excellent corrosion-resistant linear PPS resin that does not contain glass is used for the parts in contact with liquid, it is suitable for the measurements of pure water and chemicals.

### ●Complete Pocketless Structure

Because a sensor is externally installed, the pocketless structure where fluid is always moving is adopted.

### ●Noise-Resistant Structure

Because a high frequency ultrasonic sensor is used, the sensor is subject to less mechanical noise such as piping vibrations.

### ●Maintenance-free Structure

Maintenance is easy because the flow path has neither moving parts nor operating parts.

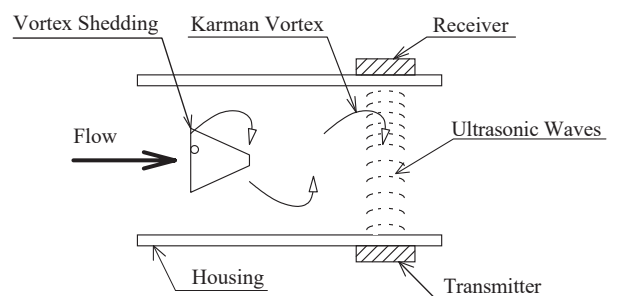
### ●Light-Weight

PPS resin series flowmeter is lightened by the resin and can be directly installed at the resin piping of the pure water line etc.

### ●Chemical Fluid-Resistant Structure

Because the amplifier case storing the electric circuit is also molded as one body with a resin, the PPS resin series is excellent in corrosion-resistance when chemicals are measured.

## Principle of Operation



## Standard specification

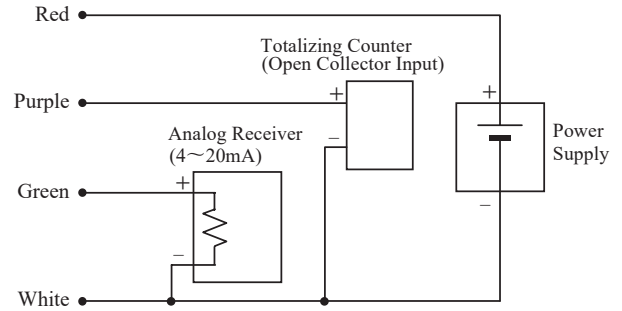
Applicable Fluid	Liquid (Water, pure water, chemical solutions not corrosive to PPS resin)	
Accuracy	± 3 % F.S.	
Flow Rate Range	3 ~ 40 L/min (Connection size:15mm) 5 ~ 120 L/min (Connection size:20mm) (In case of water)	
Fluid Temperature	0 ~ 50°C	
Max.Working Press	1.0MPa	
Connection Size	15mm, 20mm	
Connection Method	Union Joint (TS-type)	
Material	Housing	Linear PPS (Polyferron sulfide) resin
	Connector	PVC
	O-ring	FKM (EPDM)
Protective Structure	IP65 Equivalent	
Ambient Temperature	0 ~ 50 °C (However, no freeze.)	
Ambient Humidity	5 ~ 50 % RH (However, no dew condensation)	
Piping Installation	Horizontal, Vertical, Diagonal	

## Input/Output Specification

Pulse Output	Type	Non-compensated Pulse
	Output Signal	Open Collector
	Unit of Pulse	Approx. 640 P/L (Connection Size:15mm) Approx. 190 P/L (Connection Size:20mm)
	Duty	Approx. 50 %
	Pulse Width (at Maximum Flow)	Approx. 2.3ms (Connection Size:15mm) Approx. 2.6ms (Connection Size:20mm)
	Capacity	30 V DC 0.1A
Analog Output	Output Signal	4~20mA (at 0~40 L/min) (Connection Size:15mm) 4~20mA (at 0~120 L/min) (Connection Size:20mm)
	Time Constant	Approx. 3 sec. (0~90% response)
	Load Resistance	0~500Ω (depending on power supply)
Power Supply	16~26 V DC	
Power Consumption	70 mA	
Attached Cable	2 m four shield lines with heatproof vinyl insulation. (Outside Diameter:4.8mm,Core 0.14 sq.)	

## Cable Wiring

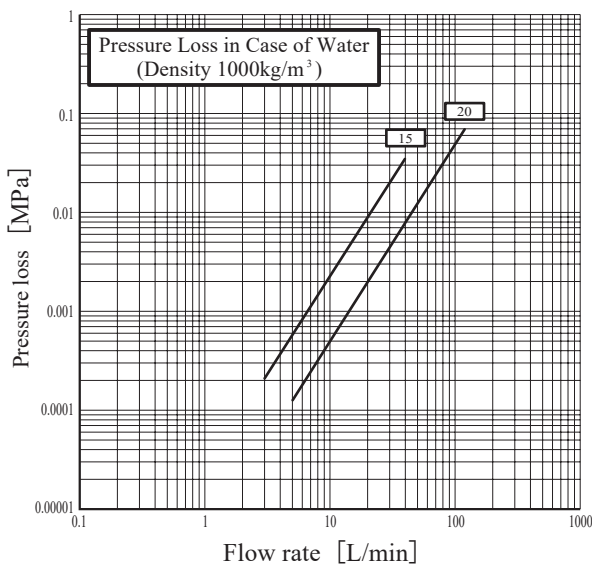
Red	Power Supply (16~26 V DC)
Purple	Pulse (Open Collector)
Green	Analog (4~20 mA)
White	Common



## Measurable Flow Rate Range

Conn. Size (mm)	Measurable Minimum Flow Rate (L/min)									Max. Flow Rate (L/min)
	Kinetic Viscosity ( $\times 10^{-6} \text{ m}^2/\text{s}$ )									
	0.3	0.5	0.7	1	2	3	4	5	7	
15	0.9	1.5	2.1	3	6	9	12	15	21	40
20	1.5	2.5	3.5	5	10	15	20	25	35	120

## Pressure Loss Characteristics



The pressure loss is calculated from the next expression.

$$\Delta P = \Delta C \times \gamma$$

$\Delta P$  : Pressure loss (MPa)

$C$  : Pressure loss coefficient (left figure)

$\gamma$  : Density of fluid ( $\text{kg}/\text{m}^3$ )

Please hold the fluid pressure, which is more than the pressure obtained from the next expression as the minimum line pressure.

$$P_d = 2.7 \times \Delta P + 1.3 \times P_v$$

$P_d$  : The downstream side pressure (MPa abs, absolute pressure)

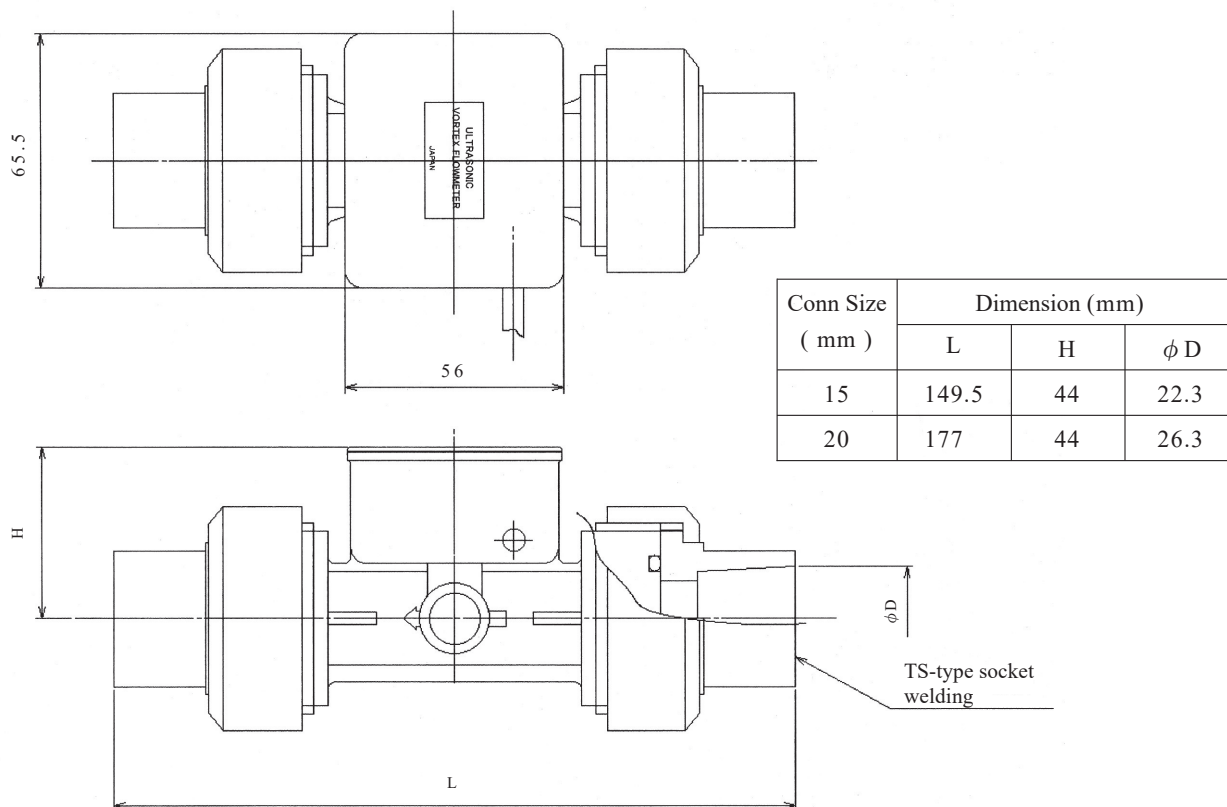
$\Delta P$  : Pressure loss (MPa)

$P_v$  : Vapor pressure of fluid at measuring temperature (MPa abs, absolute pressure)

## Basic Models

1	2	3	4	5	6	7	8	9	10	11	12	13	Contents			
F	U	Q												ULTRASONIC VORTEX FLOWMETER (PPS resin series)		
Conn. Size			B	4										1/2 B (15mm)		
			B	6											3/4 B (20mm)	
Max. Working Pressure														Max. Working Pressure (at 20°C)		
			B												1.0MPa	
														Always “—” (hyphen)		
Pluse Transmitter														Structure	Output Pulse	Analog Output
			N	W											IP65	Open Collector
														Always “—” (hyphen)		
Max. Flow Rate										040				40L/min (1/2 B)		
											120				120L/min (3/4 B)	
O-ring Material											F		FKM			
													E		EPDM	
Attached Cable Length												A	2m			

## Dimension Drawing



## Cable Wiring Points

1. Please set up the signal lines away from high voltage and high electric current source to prevent the noise.
2. Please separate wiring from the power line as much as possible.
3. Do not use a radio wave transmitter near the main unit or signal lines.
4. Length of the attached cable is 2 m. Please relay the wiring with a joint box etc. when transmitting to the long distance. It is recommended for the cable between these points that a shield cable meeting the undermentioned specification should be used.
  - (1) Cross-section Area of Cores : 0.3mm<sup>2</sup> or more
  - (2) Recommended Cable : CEV-S or CVV-S
  - (3) Transmission Distance : Maximum 100m

## Attention

- Please install a straight pipe, which is longer than 10D on the inlet side and 2D on the outlet side of the flowmeter, to prevent an influence on the accuracy due to whirl flow or turbulence flow.
- The direction of the flow specified in the flowmeter must be matched to the flow of fluid.
- When installing a flowmeter, please be careful to ensure that piping becomes coaxial with the flowmeter. Overloading the flowmeter due to misalignment may cause damage to the flowmeter.
- As for the installation position, any horizontal, vertical or diagonal position is possible. However, always fill the piping with the fluid in any position. The measurement will become impossible in the 2-phase flow (gas and liquid) or in the bubble mixed flow.
- The inside diameter of piping before/after the flowmeter must be equal to or more than the diameter of the flowmeter.
- The color tone of the main unit may change (turn green or brown) under the influence of direct sunlight, but this does not influence performance.
- This flowmeter is with excellent vibration-proof structure. However install a support if there is extreme vibration, which may cause the damage of piping.
- The measurement of the fluid might become impossible when liquid temperature changes drastically because the heat exchanger etc. exist point in the near upstream of the flowmeter. Please reduce the temperature change of the fluid by setting up the flowmeter on the upstream side or separating the flowmeter from the heat exchanger.
- There is a possibility of an error when the pulsation, such as bellows pump, is large. Reduce the pulsation with a damper etc. as much as possible.
- Please avoid the installation of the flowmeter in areas of extreme high temperature, low temperature, large heat radiation and corrosive atmosphere is strong.
- Please use this flowmeter indoors.
- Please do not use this flowmeter in a hazardous area because it is not an explosion-proof structure.
- When measuring chemicals with this flowmeter, please consult us in advance.

\*Be sure to read the instruction manual carefully before you use this meter to ensure you use it correctly.

\*Note that the contents may be subject to change without notice.

### ● Contact

#### **Tokico System Solutions, Ltd.**

Global Business Div.  
Sales Management Headquarters

Parale Mitsui Bldg, 8, Higashida-cho, Kawasaki-ku,  
Kawasaki-shi, Kanagawa 210-0005 Japan

TEL . 81-50-3852-5336

FAX. 81-44-222-7155

URL : <https://www.tokicosys.com/en/>